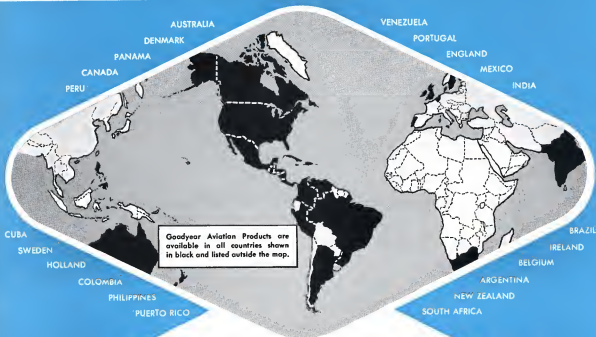


AVIATION WEEK

MAY 31, 1948

A MCGRAW-HILL PUBLICATION



Goodyear Global Service

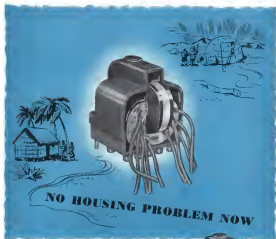
Today, many international air carriers are taking advantage of the fact that Goodyear Aviation Products are manufactured, distributed or sold in most of the principal countries along the far-flung airways of

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MORE AIRCRAFT LAND ON GOODYEAR

TIRES THA



FROM *severe* to *easy* conditions within a matter of moments is an everyday requirement for many aircraft. Occasionally, a number of such items, called *change* units, would be used in conjunction of the transformers in a plane's electrical equipment. But here, Honeywell Creative Engineering developed the need for special protection—and developed the answer.

The transformer housing of all-plastic design combines light weight, high arc resistance, low moisture absorption and strength. A corrugated and guards every type of insulation against break-down. And finally the entire unit is completely impregnated with a black wax. The result is a transformer unaffected by any type of acid or alkali in rain or in hot boiling water, then or later.

Here again is physical evidence of Honeywell Creative Engineering at work. It answers for the answer why all Honeywell aeronautical controls present improved efficiency with minimum maintenance—and are recognized for their dependability. Honeywell-Honeywell, Minneapolis 8, Minnesota. In Canada: Toronto 15, Ontario.



It's a Laboratory "Jeep"...
Honeywell Creative Engineering developed this transformer housing that effectively means dirt, dust, vibration and demands require no maintenance.

Makers of the Famous J-35 Turbine Engines
Divided as an AAF & United Boeing



GOING UNDERGROUND FOR A "WHIRL"

► This aircraft turbine wheel is about to undergo "whirl test"—a test to prove its ability to survive the tremendous centrifugal forces present while it spins at supersonic blade tip speeds.

► The test is conducted in an underground chamber from which the air is evacuated. This permits the wheel to whirl at higher speeds than required in service... for if the blades had to push air around at such speeds, enormous power would be required to drive the wheel. To detect any slight irregularity that might occur during the run, the test rig has an electronic indicator.

► Because some experimental parts are whirled to destruction to determine how much overstress they can endure, the chamber is lined with laminated boiler plate—12 inches thick.

► Each newly designed turbine wheel, compressor, and supercharger impeller must prove its ruggedness in similar tests in the Wright Aeronautical research laboratories before being released for production.

► Another example of the painstaking research behind the development of Wright aircraft turbines and reciprocating engines.



POWER FOR AIR PROGRESS

WRIGHT

Aeronautical Corporation • Wood-Ridge, New Jersey

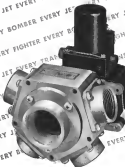
AVIATION WEEK, May 31, 1948



MINNEAPOLIS
Honeywell
AERONAUTICAL CONTROLS

U.S. PAT. 2,700,000
COPY 12, 1948

VERY JET EVERY
EVERY BOMBER EVERY
EVERY FIGHTER EVERY
EVERY TRANSPORT
EVERY JET EVERY
EVERY FIGHTER EVERY
EVERY TRANSPORT
EVERY JET EVERY



EVERY MAJOR AIRLINE USES HYDRO-AIRE FUEL VALVES

Proven proof of the superiority of Hydro-Aire fuel selector and shut off valves is their use by every major airline. Furthermore, every modern, every fighter, every jet and every transport manufactured in the U. S. today is equipped with fuel, hydraulic or pneumatic equipment that is designed and produced by Hydro-Aire.

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ONE OF AMERICA'S FINEST ENGINEERS OF FUEL, HYDRAULIC AND PNEUMATIC EQUIPMENT

NEWS DIGEST

DOMESTIC

Air Force Strategic Air Command will move its headquarters to Offutt Air Force Base, Omaha, Neb. from Andrews Field, Md. in the next 90 days.

Senate Armed Services Committee approved a bill authorizing the government to place additional surplus plants on a standby basis. The move would affect about 250 surplus plants still held by the government.

Establishment of the Civil Air Patrol as a permanent volunteer civilian auxiliary of the Air Force was approved by the Senate last week. The bill would permit CACP use of Air Force fields, oil, fuel and supplies.

Cowles-Laird will enter into selected passenger service contracts on American Airlines' Washington-New York, Washington-Chicago and Washington-Charlotte-Columbus-Indianapolis-Chicago routes. The contract has steady flown a 100,000-mile transcontinental cargo schedule and hundreds of passenger flights throughout the American Airlines system over the past few months.

FINANCIAL

Lockheed Aircraft Corp. announced sales totaling \$12,375,732 for the first quarter ending Mar. 31, compared with \$19,071,704 for the same period last year.

United Aircraft Corp. showed net income of \$3,240,230 or \$1.10 per share for three months ended Mar. 31.

McDonnell Aircraft Corp. net income for the same period ended Mar. 31 was \$254,600 or \$1.10 a share.

Republic Aircraft Corp. reported profit of \$1,571,394 before taxes for first quarter of 1945 on sales of \$14,374,024.

Boring Aircraft Co. reported a net loss of \$74,615 during first quarter of 1945. Sales amounted to \$19,362,932.

FOREIGN

France de Gaulle will increase its Lockheed Constellation through service between Rio de Janeiro and Buenos Aires from two to three round trips per week to accommodate the increasing traffic over the route. The six-hour flight is proving increasingly popular with the debut of the Constellation.

Chaudron planes will fly aerial to "somewhere" in the new state of Israel "at the order" said by the Jewish Agency. U. S. Post Office expedited airmail to Palestine a week ago.

BIGGER, MORE USEFUL; SAFE, FAST AND RUGGED



NAVION LOGICAL NEXT STEP FOR 2-PLACE OWNERS

Actually much easier to fly than many 3-place planes, the new 1945 Ryan Navion is the ideal next step for the small plane owner who recognizes the need for top cross-country performance and real business-plane utility.

The 1945 Ryan Navion has not sacrificed ease of flying in order to obtain its 150-mph speed or its roomy 4-gate cockpit comfort. Its interconnected ailerons and rudder give its optional coordinated two-control system, assuring stability and relaxed flying even in rough air. Unique all-around visibility makes every maneuver... in the air and on the ground... easier... safer.

The Ryan Navion is designed to "go places" just and to land you wherever business or pleasure requires. Hydraulic flap, steady hydraulic landing gear with overvoted wheels and tires, and the largest standard nosewheel, assure efficient operation from short, rough fields, even in strong cross winds. The powerful 185-hp engine gives the Ryan Navion a climbing rate of 830 feet a minute, and a normal range of 500 miles. The new optional auxiliary tank gives it a maximum range of 750 miles.

Safety and dependability are built into the Ryan Navion, as thick-skinned all-metal ruggedness means not only extra strength but permanent beauty and ease of maintenance.

Owners seeking the best will find that the new 1945 Ryan Navion has blended together all the characteristics most desired in 4-place planes, as evidenced by customer performance have been sought at the sacrifice of other important qualities.

HERE'S THE BEAUTIFUL new 1945 Ryan Navion in Glendale, Tex., one of four brilliant enamel colors now available. Among other new features in 1945 are drift-free vibration, improved interior styling, perforated sound insulation and a new, improved fuel system. Many mechanical refinements have been made in plane, engine and propeller.



FUELTY OF 120 AND SHOW ROOM For 4 passengers and three baggage in the Ryan Navion, sales are remarkable to hold 645 lbs. of cargo. 55 cubic feet, easily loaded by removing cargo. Gas runs in 50 inches in front and 40 inches in back. Exhausts 6-12 inches and baggage compartment holds up to 380 pounds in 20 cubic feet of space.



IN AND OUT OF SMALL FIELDS with its guarantee of fuel! You needn't believe how easy it is to fly this too, for place and you actually say it yourself! For streamlined handling and a fast trip inside 800 miles, write to an expert business specialist. We'll bring you private dealer and a Navion at your disposal for a business or pleasure trip.

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Look for these Patterns of Purity



Vol. 46, No. 22

AVIATION WEEK

May 31, 1948

All-Weather Airways Gains More Ground

Commerce and Defense Departments agree on board to develop billion-dollar system.

By Robert Hays

Administrative pattern of the proposed billion dollar all-weather airways system began to emerge in Washington last week.

Basic control of the system will be vested in the National Defense Establishment through an Air Navigation Development Board charged with primary responsibility for all research and development work for the program.

Joint Agreement—This board was established by agreement between Defense Secretary James V. Forrestal and Secretary of Commerce Charles Sawyer based on recommendations by the Research and Development Board's all-weather Committee of Navigation headed by Ralph Henson, president of Avionic Auticon.

The ANDB will be a five-man group with representatives of the Air Force, Navy, and CAA. It will operate for long-range purposes only within the

Department of Commerce. Eventually this board will be replaced by an executive director and a "system engineering group" of technical experts.

Final details including voting provisions, are being established by a temporary working group consisting of B. A. Davidson (CAA), Capt. Felix Bitter (Navy) and Col. S. A. Mendenhall (USAF). The permanent ANDB will be the final arbiter on equipment and procedures to be used in the post-military civil all-weather airways program. Another permanent navigation committee will be organized by the military Research and Development Board to represent land and marine navigation programs in addition to monitoring the airways program.

► **ACC Census**—Complementing the work of the ANDB will be personnel on navigation committee of the Air Coordinating Committee. Makeup of the group has not yet been finally approved by ACC but will probably consist of representatives from CAA, USAF, Navy, FCC and Coast Guard with consulting representatives from Airline Operators and Pilots Association, Air Line Pilots' Association and Air Transport Association.

The ACC group will be responsible for determining operational requirements of equipment needed for the all-weather airways program while the ANDB will be responsible for evaluating these requirements in light of additional national defense needs and making a final decision. Final decision on the type of equipment and their use will rest with ANDB. In general, the military will present its non-tactical requirements (principally the strategic air transport) through the ACC group and its tactical requirements for air defense and combat operations through the ANDB.

► **Value Still Doubtful**—Big issue is whether the ANDB will have veto power over the ACC navigation committee requests for specific equipment.

Both groups will be graded, but not bonded by, the secret agent of the



RALPH HENSON's committee outlined administrative basis that will govern program.

Radio Technical Commission for Aeronautics special committee No. 34.

► **Special Studies**—Already two new special committees have been organized to study specific problems arising out of the all-weather airways program. One group is concerned with distance measuring equipment. The other is determining whether the private line used for ground communications required by the new airways system should be combined with airborne radar identification beacons. Results of these studies will be referred to the ACC navigation committee and ANDB for final decisions.

The complex interdependent relationships involved in the all-weather airways program are by no means easily determined. Considerable confusion more sharpening between the agencies remains before the final administrative pattern will be set.

► **Funds Doubtful**—The RTCA SC-31 report estimated \$75,000,000 of the required \$1,111,000,000 total cost of the all-weather airways system for research. The \$75,000,000 would be controlled by the ANDB while the ACC navigation group would represent expenditures of \$1,036,000,000 for production equipment to be used by the system. RTCA estimated that military share of the equipment program would come to \$765,000,000 with \$124,000,000 as the civil agencies' share.

Size of Air Force Remains in Doubt

President hints he will not spend all of procurement funds; Vinson says operational budget is insufficient.

The Truman administration is still strongly opposed to the Air Force program to develop its own independent support in Congress. Last week, the President found two ways to slip the Air Force's wings.

• **USAF Budget Bureau** proposed funds for fiscal 1949 equivalent for short of USAF requirements.

• **He signed** the \$1,195,168,000 procurement bill with a clause that he does not feel bound to sign any expenditure of that other amount.

At the Capitol, Rep. Carl Vinson (D, Ga.), ranking minority member of the House Armed Services Committee, disclosed that the budget sent to Congress for Air Force maintenance, personnel and operations is more than \$100,000,000 less of what is needed to keep 66 groups flying.

At the White House, President Truman agreed that appropriations bill signing. "Congress has seen fit to provide \$522,500,000 beyond the amount which I considered necessary in submitting my request for the acceleration of the program."

"Truman is made, however, that the funds shall not be spent without a feeling by the President that the 'correct' law is necessary to the national defense and that the procurement results in maximum retention of air service units in aircraft and equipment consistent with the defense needs of the United States."

"To assist me in discharging this responsibility, I have named Mr. Stanley for Defense and the director of the Bureau of the Budget to formulate and recommend appropriate procedures . . . I intend to review the entire military program in September and again in December. Our national security is so great that the total national defense program be limited on a strong economic system and depend on a level of expenditure which can be sustained in subsequent years."

To some, that was clear warning that the Air Force's 79-Group program was being thrown out the window. The \$522,500,000 borrowed from the Procurement bill was the additional amount as provided by Congress for procurement sufficient to build up the Air Force to 75 groups.

Last January the Administration paid nearly 55 groups. Failure to back down at that time has done nothing to 66 groups at the size of the permanent Air Force.

Whether that was a possible even

temporarily last week was in doubt.

• **Budget Response**—Under the old 55-Group program, the Administration asked \$697,000,000 for Air Force operations in fiscal 1949. When it signed its program to 66 groups it submitted a supplemental request of \$210,744,000, making a total operational budget of \$907,744,000. Veterans met this, with Army allocations for USAF support, still at \$100,000,000 less than USAF wants it needs for operating a 66-Group force.

The second figure would provide for 456,000 man years, compared with the current strength of 374,000 and the \$28,000 requested for a 79-Group program.

Vinson's breakdown on same Budget Dept. figures of USAF estimates for organizing a 66-Group program:

- **Space Units and Aircraft Modification**—USAF asked for and obtained \$50,000,000 under the 55-Group program. But USAF's request for \$55,000,000 supplemental for a 66-Group program was increased by Budget Dept. to \$50,000,000. So USAF is offered a total of \$100,000,000 for the coming year—\$15,000,000 less than it asked.

- **Civilian Personnel**—USAF asked for and obtained \$15,000,000 as the budget for a 55-Group program. The army's request for \$20,000,000 additional for 66 groups was cut to \$15,000,000 by Budget Bureau. Approval of allocation at \$15,000,000. USAF asked for \$15,000,000 under the 55-Group program. But USAF's request for \$15,000,000 for 66 groups was cut to \$15,000,000 by Budget Bureau. Approval of allocation at \$15,000,000. USAF asked for \$15,000,000 under the 55-Group program. But USAF's request for \$15,000,000 for 66 groups was cut to \$15,000,000 by Budget Bureau. Approval of allocation at \$15,000,000.



REP. CARL VINSON says Budget Bureau is cutting USAF below 66 groups.

Airport Lighting—What's Ahead?

Lighting an airport used to be a simple matter. Just if it is a very busy. Commercial airports are given greater reliability. Bigger, faster planes require greater approach and landing times. And lighting technology has made such advances that engineers now know what was wrong with older methods.

What has gone before and what is likely to come are told in a special Aviation Week report by the industry on airport lighting—page 28 of this issue.

For 66 groups was slashed to \$7,500,000 by Budget Bureau. USAF would have \$71,000,000—\$24,000,000 less than it requests.

- **Dependent Air Bases**—Indefinite support from the Army. USAF originally asked for and obtained, under the 55-Group program, \$12,000,000. It is spent for \$12,000,000 additional for a 66-Group program was cut back by Budget Bureau to \$21,000,000. This gives the amount a total of \$71,000,000, at \$11,000,000 less than it needs.

Jet Engine Approved For Transport Use

Allison 400-C turbojet engine has received the first Approved Type Certificate from the CAA authorizing its engine installation in commercial twin prop aircraft. At least three jet transports utilizing the new engine are now in the construction stage.

The engine is rated at 4000 lb. thrust without the use of afterburning. Water injection increases thrust output to 4600 lb. for short periods. The commercial engine weighs about 1500 lb. That these ratings have already been accepted in new military versions is testimony from Air Force stipulation that Allison can offer jet engines commercially only at such level that no imposed service as a production manufacturer for military use.

Issuance of AEC No. 274 is indicative of the fact that the engine passed the standard CAA type certification tests prescribed for conventional reciprocating types including checks for behavior on altitude. Allison is proud to produce the commercial engine in quantity since its present facilities are well above adequate to meet commercial needs in addition to its expanded military procurement program.

NACA Committee To Investigate Fire

A scientific study of the problem of aircraft fire has been launched by National Advisory Committee for Aeronautics. Under the personal direction of Lucius A. Rader, 1944 Collier Trophy winner, the program is designed to increase basic knowledge in the field of combustion and its relation to aircraft safety.

Assigning Rader to the administration of the project is a special 15-man subcommittee including representatives of military, government and private aviation research efforts concerned.

First phase of the study, according to Rader, is a thorough review of current information and an analysis of present programs both here and abroad to determine gaps in existing knowledge. Rader plans a trip abroad to survey the field in England, France, Switzerland and Sweden. He feels that present activities in the aircraft engine of operation and propulsion that only a comprehensive scientific research program can resolve. He believes there are two approaches to the problem.

- **Reduction of Hazard**—New research is needed on the sources of fire, such as the ignition, exhaust, fuel, lubrication and afterburn systems.
- **Flammability**—A study is required of the physical and chemical phenomena of fire in engine compartments, knowledge of outgassing agents and their action, and the flammability of aircraft fluids and materials.

Rader has set no time limit on the completion of the entire program. The immediate, two-year goal is to solve the most pressing problems (fire sources in flammable fluids). The basic combustion and outgassing research programs will extend well into the future. First organizational meeting of the subcommittee was held at NACA Flight Propulsion Research Laboratory, Cleveland March 15 and other meetings will be held in regional. Although the program will be conducted at Cleveland, Rader plans to utilize all available facilities at Wright Lab, CAA at Indianapolis, General at Ithaca, N. Y., and private laboratories throughout the nation.

• **Members**—NACA, subcommittee on Aircraft Fire Protection.

Lucius A. Rader, NACA chairman, Arnold Research, experiment chairman, Air National Command, Charles W. Shuman, Navy Bureau of Aeronautics, Harry L. Ransbury, CAA Experimental Station, Indianapolis; John M. Chavakis, CAA Safety Section; J. A. Dickmann, National Bureau of Standards; E. M. Barber, General Electric; R. E. Rader, The Texas Co. John

G. Berger, chief project engineer, Tuscon Aircraft, David L. Porter, Chief Aeronautics Administration, Allen W. Dallas, Air Transport Association, Harold E. Butler, engineering dept., American Airlines; C. R. Johnson, Shell Oil Co.; Raymond D. Kelly, engineer development, United Air Lines; Clifford W. Newton, power plant unit, Boeing Aircraft Co.; Orr E. Shogren, Douglas Aircraft Co.; Lee Stray, Jr., Lockheed Aircraft Corp.; and C. G. Trenchard, development engineering, General Electric.

Taylor and Cook Form Washington Company

Irving H. Taylor and Charles M. Cook, former Washington separate tasks for Douglas and Consolidated Vultee, respectively, have announced establishment of Industry Services, Inc., to represent aviation companies and allied interests at Washington.

The new firm, with offices at 810 Dupont Circle Bldg., will help clients with engineering, development and technical problems as well as act as a liaison with federal agencies and foreign purchasing interests in regard to sales.

Taylor is a director of the Babb Co. Inc., was formerly assistant to the president and senior representative of Douglas Aircraft Co., general manager of the Aeronautical Chamber of Commerce (now AIA), chief of the aeronautics branch, trade division Bureau of Foreign and Domestic Commerce, and commercial attaché in Mexico. Cook served previously at

Washington representative for Convair, chief of research attaché, Office of International Trade, and export manager of the Aeronautical Chamber of Commerce.

ICAO Delegation

President Truman has approved a 25-member delegation to represent the U.S. at the International Civil Aviation Organization's second assembly at Geneva, Switzerland, June 1.

Russell B. Adams, Air Aeronautics Board member, will head the U.S. delegation. John Adams, assistant Secretary of Commerce for Air and Fuel, second assistant Postmaster General, will be assistant. Hal E. Tibbitts, vice president of Lockheed Aircraft Corp., and Stuart G. Tipton, general counsel of the Air Transport Association will attend in advisory status.

New Speed Record

Josephine Cochran (J44H) made her steepest climb North American P-51 Mustang fighter won a 2000-mile flight at an average speed of 485 mph in 41 hours and 15 minutes.

The aircraft, a new world record for the distance. The clock of 440 mph was set by Lt. J. J. Hancock, USAF, in a Lockheed P-50 Shooting Star jet fighter. Cochran's 7 hr., 46 min., 58 sec. endurance between Palm Springs, Calif. and Santa Fe, N. Mex. was officially timed by a representative of the National Aeronautics Association.



B-36 PRODUCTION FEATURES REVEALED

Major design changes in production model Convair B-36A are revealed in close up here. Quadrotor landing gear, right, delineates ground load to present operation on wide variety of airfields. Each fuselage wing tip is linked to wing beam on wheel track to support loads in flight. Landing gear tracks front link is shock strut 64



ing initial landing loads. They upper strut tracks on lead link design modifications of gear. New bubble canopy and nose radome, left, enables prepositioning, then in flying attitude framework rather than angle-down design. Transverse fuselage on laminated glass and plastic and compound stress required separate mold.

Conflict Perils Plane Development

All favor the "objective" of legislation for federal financing of transport types, but differ on method.

Plans for the government to finance development of commercial transport and cargo planes may be lost in a case of controversy over who will do the job and how.

That was plain last week as committees tackled the bills introduced by Owen Brewster (R., N.Y.) as the Senate and Carl Hisebush (R., Calif.) in the House. The identical measures would:

- Lodge direction of a program to develop types suitable for both commercial and military use with the Secretary for Air.
- Authorize him to spend Air Force funds on the project.
- Authorize him to appoint a five-member advisory Civil Air Transport Extension and Development Board consisting of representatives of USAF, Navy, CAB, CAA and NACA.
- Provide for a six-member industry advisory committee to function under the board.

The controversy centers around those features.

Agreement on Methods—Witnesses representing CAB, CAA, and the Air Force, the air transport and aircraft manufacturing industries last week appeared before hearings of the Senate Interstate and Foreign Commerce Committee and the House Armed Services Committee. They agreed on many points, including the "objectives" of the Brewster-Hisebush bills, but differed widely on the method for its accomplishment.

CAB Chairman Joseph O'Connell issued a middle message between CAA, calling for almost exclusive control of the program, with the Air Force, Air Transport Association and some aircraft manufacturers endorsing the bill's plan for industry control.

Joint Control—Although O'Connell's plan was presented as a compromise on the civilian versus military control issue, it would drastically shift the weight of authority to civilian side. It offers the brightest hope for agreement among administrations, Congressional, and industry representatives and admits that a accomplished, legislation appears to have little chance of enactment at this session.

"While CAB still favors the development of transport through an independent commission [proposed of the new membership on the proposed Civil Air Transport Extension and Development Board], O'Connell testified, "I believe that the program as it reflects compromise as it is would not appear its adoption within the general administrative framework of the Brewster-Hisebush bill."

Board Changes—The amendments he proposed, enhancing the role of the Civil Air Transport Extension and Development Board (composed of three civilian and two military members) and diminishing the role of the Secretary for Air, would however result in exclusive civilian control of the program. That the board, instead of the

Secretary for Air, be given responsibility for making a national survey of military and cargo plane requirements, that chairmanship of the board be limited to its civil representatives, that it be permitted to determine its own procedures and regulations, that it submit for by a five-member advisory committee to oversee military representatives, that the board—rather than the Secretary—name the industry advisory panel, that the board be given the authority to determine the descriptive and specifications for prototypes and the role of the Secretary be restricted to approval or rejection, that Air Force funds for commercial plane development be specifically restricted, among other things, to the purpose of:

- **Opposition**—The administration is expected to oppose the bill in its present form and recommend revisions along the line suggested by O'Connell. The Air Force, which regularly reported enactment of the measure made a last-minute switch in its position, after being notified of Budget Bureau opposition to its provisions. It is testimony C. V. W. H. Secretary for Air modified USAF's position to "support of the intent" of the measure.

Law's Testimony—Frederick B. Lee, acting CAB administrator argued that the Department of Commerce be authorized to undertake the developmental program. Both Lee and O'Connell emphasized the need for development of small types for feeder service. In a large measure, O'Connell said, the current difficulties of the airlines are due to the fact that small planes are not available and they are forced to operate 12-passenger DC-3s with small loads. Lee added that numerous firms engaged in feeder service find it impossible to finance enough large aircraft to accommodate DC-3s, and develop a new of smaller craft would lighten the financial burden of airport operations as well as lighten load on ATAs.

ATA's executive vice president, Robert Rumpel, endorsed the Brewster-Hisebush proposal.

Navy Wish Supplanted—John Nields and Edwin Stevens, Secretary for Air, said that the Secretary for National Defense's ruling that airplane development be lodged with the Navy be written into the measure as an integral part.

Four aircraft manufacturing agencies have enthusiastically supported the Brewster-Hisebush measure, suggesting that similar manufacturing enterprises are able to withstand the impact of independent development of aircraft as well as the military. They were: Republic & Wright, president, Curtis Wright; Albert LeMay, military air manager; Consolidated Vultee Aircraft; and Robert Gove, president Lockheed Aircraft.

Manufacturing Testimony—Lombard said that the bill's prohibition against the use of developmental funds for "auxiliary equipment" meant that aircraft, etc.—be shrewd and, also, "CAA request the manufacturer to submit an airplane in its completed state for airworthiness tests and tests and other standard Federal tests—such as tests showing structural integrity." Rumpel endorsed the amendments proposed by O'Connell which would switch control from the Secretary for Air to the civil departments. Civil Air Transport Extension and Development Board. Gove, on the other hand, declared that "the bill is right because it gives the Air Force, which will be the principal user of the product in the event of a national emergency, the responsibility for its development."

Independents Fight Economic Regulation

Independent air operators have presented their case against regulation of contract operations.

Their chief spokesman, Raymond Needles, president of Seaboard and Western Airlines, proposed a "reasonable requirement" for safety regulation and regulation of contract carriers. But, he told the aviation representatives of Senate Interstate and Foreign Commerce Committee, the independents oppose legislation bringing all contract operations (except independent flights of planes with five or less passengers) under economic as well as safety regulations.

The independent's leading voice on this bill which is sponsored by the Congressional Aviation Policy Board, five members of which are on the independents.

Independent Spokesman—O'Brien testified for the independents that CAA, Bureau Transport, Trans Air Corp., Henry Merrill, executive director, Aviation Trade Association, Elwood Machine, Seaboard and Western. B. B. McCoy, director of the Bureau of Transport and Commerce Commission and Edward Darnold, special assistant to the Attorney General, gave Gove name and Justice Department backing to the independent's position. McCoy maintained that regulation and regulation by contract carriers would make the main complaint of independent airlines, namely, that contract carrier services are being engaged to make the gains of independent service over exchange regulation by the governing agency.

Robert Rumpel, representing Air Transport Association and Kinney Nields, representing CAA, endorsed safety and economic regulation. They previously testified before the House Interstate and Foreign Com-

merce Committee, which conducted hearings on the subject without testimony being presented by representatives of the independents.

CAB Authority Opposed—Needles hit at provisions giving CAB authority over international contract carriers, prohibiting day-charter of non-scheduled airplanes in the same area, and directing the presence of contract licensees in such service.

Pointing out that CAB lacks authority to regulate international scheduled routes, Needles and other independents over contract into would "enable restricted carriers to piggy back" so as to take business away from the contract carriers whose rates could not be restricted without the intervention of the board." He declared that it is "absolutely essential" that contract carriers be permitted to obtain flexibility and enter contract and occasional service in the same period. The provision, plan for "agreement that such contract carrier license specify the points and area to be served, the nature of traffic and compensation to be transported" would be "a serious obstacle" in numerous number of flights for which contracts may be made—would defeat the essential requirement of flexibility inherent in contract business."

He said members O'Connell flexibility would be further strengthened, he suggested, by a provision that CAB suggest licensees which services are not performed over routes and at the frequency authorized by the license.

Aircraft Committee For Munitions Board

A permanent aircraft committee of the Munitions Board has been organized with Paul Adams A. M. Peave, president of the Aircraft Industries Association, as chairman.

The Board was set up as a result of a study by Maj. Gen. Oliver T. Latham, wartime chief of Air Force procurement at Wright Field and now president of the Aircraft Industries Association. Established as special committee to deliver Secretary Personnel (Aviation Week, Apr. 1) for the job and last news released in dates as AIA's statement.

USAF Members—USAF is represented on the Board by Maj. Gen. E. M. Powers, Maj. Gen. J. L. Smith and Brig. Gen. A. A. Keady. The Army member is Brig. Gen. J. C. Christensen. In addition to Peave, the Navy committee members of Rear Adm. W. W. Lutz and Captain Lloyd Hartman.

Primary function of the new committee are:

- Coordinate current aircraft procurement programs of all three services and develop and submit modifications plans for the aircraft industry.
- Coordinate standardization of parts, materials, processes equipment and design requirements and test procedures.
- Allocate materials in accordance with priorities established by the Joint Chiefs of Staff.
- Determine supply and maintenance requirements for spare parts and parts for military aircraft.

- Stimulate military aircraft use by civilian firms and contractors.
- Evaluate current and future procurement indicating areas where there will be shortages of labor, materials and production capacity.
- Recommend legislation necessary to implement industrial mobilization of the aircraft industry.
- Recommend any dispersal action deemed necessary for the aircraft industry.
- Recommend allocation of manufacturing plants between the USAF and Navy for production procurement and planned emergency expansion.

New Use for Copier

A new government use of the helicopter among possible finds—has been suggested by the Interior Department through contacts with private helicopter operators. Following a successful operation in Colorado this spring, Interior is planning a preliminary survey in late phase in Alaska this summer.



XS-1 INSTRUMENTATION REVEALED

Minor of complex flight systems instruments carried in the experimental XS-1 research plane are shown here displayed adjacent to special instrumentation at which they are installed. Instruments permit calibration, recording and transmitting flight test data on

control lines, descent level, engine pressure, fuel flow, and aircraft performance. Two instruments were especially designed and developed by the National Aeronautics Commission for the experiment.

INDUSTRY OBSERVER

► Republic started deliveries on its new F-16C Thunderbolt fighter in April, and the model is now current type in production. Originally designed to use the new General Electric F110 (TF34-900) engine, production delays in engine deliveries have resulted in the new model going into service with the standard Allison 2500 (TF34-900) engine instead. The F-16C is being applied to the 33rd Fighter Group, Waller Air Force Base, Brevard, N. M.

► Navy's 60-cylinder engine gas is now in quantity production and is being installed on the new Grumman F-16B fighter and the McDonnell F-16B fighter jet fighter. The gas has a slightly lower rate of fire than the standard F-16, but its heavier duty enables it to deliver a greater weight of fire. A suitable type, suitable for pre-warrior fighters, is now under development test.

► North British B-15 flying wing bomber has been flight delivered from the Blackburn, Calif., plant to Marine Air Force Base, Calif. The flight was made by Fred Renshaw, pilot, Charles Renshaw, copilot, and Owen Douglas, flight engineer. Under Marine National Air Force 1964, it is now assigned to the Northrop test pilot staff and was being "bounced out" in the long wing.

► Air Force has disclosed two new helicopter projects, the Sikorski XH-35 and the Sikorski XH-35, both considerably larger than anything yet contemplated. The Sikorski design follows the familiar Navy HH-19 helicopter layout, but it is about twice as large. It will be able to carry 25 fully equipped troops or 3000 lb of cargo. The Sikorski design will utilize the General Electric-developed jet engine (Aviation Week, May 13 on a 1364). Made. The "Tung" group design will be used to lift loads up to 24,000 lb and carry 1000 lb of fuel, sufficient to get a tank across a wide river or a stretch of difficult terrain.

► Air Transport Association probably won't fight CAA's order requiring a third flight crew member on the Boeing Stearman. But the airline group will continue to insist that a flight engineer is not needed on DC-6s on the basis of the pilot's operating record to date and because CAA has approved the DC-6 as a two-man airplane after proving it.

► Airlines figure they lost between \$500,000 and \$1,000,000 as a direct result of CAA's order forcing utilization of trainees previously authorized on all aircraft used in scheduled service and serving passengers at night in scheduled flight and conditions. The Board recently ruled that airlines, which were to have been effective May 15, claiming that its order was premature in view of evidence that the trainees have not yet been sufficiently perfected (Aviation Week, May 10).

► British Overseas Airways Corp. negotiations with Canadian, Ltd., Montreal, for the purchase of 517,000,000 worth of DC-4M transport lot, promising Canadian a complete delivery of 20 of the lot to Trans-Canada Air Lines for both domestic and international service. BOAC's first Atlantic route just last TCA's Canada-Atlantic-England-London route.

► British Ministry of Civil Aviation has returned the Yanks IV to passenger service but will not allow it to fly on the Azores-Bermuda route where a 787A Yanks IV was last without issue. British is still raising cargo and fuel consumption tests on the plane. The Azores-Bermuda route has long been known for its highly variable headwinds and unpredictable storms.

► Air Force will put the Boeing XH-37 through its Phase 3 test program at Mease this month. Several XH-37 has been completed and will be turned over to the Air Force this month. Boeing will eventually get both planes for a third phase test program including maximum speed and altitude tests.

► Prototype of the Italian Breda-Zapata BA 308 multiengine transport is nearing completion. Three have been ordered by the Argentine Air force and four by Ahiha, a British-controlled Italian airline.

► Prototype McDonnell XP-55 was damaged when a crane lifting it into place in the NACA Ames Laboratory 50 ft by 30 ft wind tunnel failed and dropped the prototype. The prototype fighter was situated in the St. Louis plant, involved and is now back at Ames undergoing steel barrel tests.

► Curtis XP-57 has completed 15 flights at Air Force base Mease, Calif., and is now undergoing several weeks of ground modifications including connection of the engine pressure and cooling systems, tail modifications and structural work of fuel tank supports.

New Race Group

Southern California International Air Race, Inc. has been formed under the auspices of the Southern California chapter of the National Aeronautics Association to stage an annual motor race. The first race will be held early next year at the Long Beach (Calif.) Municipal Airport.

Active in the new group are Larry Thurston, NAA official team; Gene Odell, manager of Hughes Aircraft Co. and William Whitman, owner of Whittier Airport. The nonprofit organization will also sponsor an annual aviation exposition and local model airplane contests.

AVIATION CALENDAR

- May 11—C-124B second assembly plant test, National Center, Indianapolis.
- May 12—C-124B second test, Western Air Force, Mease.
- May 13—C-124B second test, Western Air Force, Mease.
- May 14—C-124B second test, Western Air Force, Mease.
- May 15—C-124B second test, Western Air Force, Mease.
- May 16—C-124B second test, Western Air Force, Mease.
- May 17—C-124B second test, Western Air Force, Mease.
- May 18—C-124B second test, Western Air Force, Mease.
- May 19—C-124B second test, Western Air Force, Mease.
- May 20—C-124B second test, Western Air Force, Mease.
- May 21—C-124B second test, Western Air Force, Mease.
- May 22—C-124B second test, Western Air Force, Mease.
- May 23—C-124B second test, Western Air Force, Mease.
- May 24—C-124B second test, Western Air Force, Mease.
- May 25—C-124B second test, Western Air Force, Mease.
- May 26—C-124B second test, Western Air Force, Mease.
- May 27—C-124B second test, Western Air Force, Mease.
- May 28—C-124B second test, Western Air Force, Mease.
- May 29—C-124B second test, Western Air Force, Mease.
- May 30—C-124B second test, Western Air Force, Mease.
- May 31—C-124B second test, Western Air Force, Mease.

ENGINEERING & PRODUCTION

Boeing Strike

Can in Seattle retail sales due to payroll losses may be force for settlement.

The union showed signs of softening, the company stood firm and the city seemed to be the side at Boeing-Seattle in its current strike.

Of the three factors, the attitude of the community might be the most telling. Last week, with \$1,730,000 at stake in the strike, most retail stores were holding the pinch State, with volume out to much in 15 percent, lost of output.

► "Call A Strike"—In a page one editorial, the Seattle Post-Intelligencer declared, "It's time to call a halt" to the strike, "before our customer industry is jeopardized." Both the company and the union have an obligation to themselves, to the community and to the nation—to settle the dispute.

As if an answer, John McIlwain, a vice president of International Association of Mechanics (parent body of Associated Mechanical Union) offered to "submit to changes in our wage-making committee if facing well-known unions to changes in its organization."

Boeing's President William M. Allen replied, "We feel the union offers should immediately call off this animal and end the strike. Our objective then would be to negotiate a fair and workable contract." If the strike were called off we would deal with the duly constituted representatives of the company, whoever they may be.

McIlwain declared IAM would call off the strike only "when an agreement is reached that is satisfactory to the 18,800 Boeing employees we represent." He and the union are willing to do everything possible, short of ending the strike, to get the company back into collective bargaining. He and the company are committed to be the main point of blocking settlement between the company and the union.

► Wage Increase—Being reluctant to surrender for workers willing to come the picket line and make it more tempting by getting a 15 cent an hour wage increase, all hourly employees Allen claims the increase would Boeing demand the best paid aircraft workers in the world. At present the best workers about 1600 men, but

Convair Changes

Harry Woodhead has been elected vice chairman of the board of Consolidated Vultee Aircraft Corp. He resigned as president to take the new position. Floyd B. Gilman, chairman of the board, becomes president for an interim period, with indications that the post eventually will be taken by La Monte Colton, who resigned recently as president of TWA. L. W. Miller succeeds V. C. Schriener as vice president in charge of finance. Schriener resigned because of ill health. Miller formerly was vice president and treasurer and member of the board of Northeast Airlines.

A net loss of \$2,765,918 in the first quarter of the 1945 fiscal year, ended Feb. 29, was reported by the corporation.

would apply to all union members should they all decide to return to their respective jobs.

The union demands a 30-cent increase, 10 paid holidays and vacation of the making strong security check. To this Allen says he is open to the "reasonable we can pay and still be competitive" and the company must have a "modified security system to build an efficient working organization."

\$2,500,000 Overhaul Contract for TEMCO

Air Force contracts for overhaul have been long anticipated by independent maintenance organizations. The first of these, 18,800 Boeing employees we represent. He and the union are willing to do everything possible, short of ending the strike, to get the company back into collective bargaining. He and the company are committed to be the main point of blocking settlement between the company and the union.

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wealth. The company now employs 1500. ► Complete Overhaul—AAF will start delivery of the C-54s to the Davis Air Force Base, Tex. 1. Various deliveries of the overhauled ships will begin in August. Overhaul includes the sealing of aircraft fuel tanks, engine changes and complete final assembly operations, including final flight testing of the planes by TEMCO.

The company is currently modifying Martin 2-02s in the Northwest Airfield and is modifying an aircraft overhaul program conducted with the Brazilian government.

Personal Plane Exports

Yankee personal aircraft companies reported 78 aircraft valued at \$103,412 for the month of April, it is announced by Aircraft Industries Association.

The totals represent 10 percent of production and 15.5 percent of dollar value for the month compared with a comparable 47 planes, of \$72,071 of all production, valued at \$27,157 for the previous month, when dollar value was 9.5 percent of total output. Continued operations on Brazil which received 71 aircraft valued at \$182,019. Canada was second, receiving 67 aircraft valued at \$57,500.

Other exporters—South Africa, Iran, Mexico, Iran, Argentina, French Indo-China, Iran, Chile, Cuba, Iran, Switzerland, Uruguay, Peru; Colombia, Haiti, India, Netherlands West Indies, one each respectively.

Wright Averts Strike

Wright Aeronautical Corp.'s 1400-plant of 1400 white-collar workers was averted last week when union and company officials agreed a contract guaranteeing employees a 10 percent pay increase, retroactive to May 6 and terminating Sept. 8, 1949.

Settlement came a year of \$600,000 to the workers and the Engineering and Salvage Employees Association. Local 300, UAW-CIO. Starting wages range from \$40 for most shifts to \$115.20 for day and night shifts. Average pay is estimated at \$5.73 per hr.

Lockheed, IAM Negotiate

Wage increase agreements, including a proposal which provides a flat cost increase for hourly employees, have been reached between negotiating committees for the Lockheed Aircraft Corp. and the International Association of Mechanics.

The agreements will be based on IAM membership on or before June 1. If approved, they will be retroactive to May 15.



APPROACH TO ARGENTA Landing Aids Experimental Station probably has more lights than any other in the world. The front of photo under the DC-3 marks five different types of lights in

systems. Most easily seen are the AGA (aerodrome) system (bottom left and right) and CAA's (aerodrome) system, appearing as deck (right) lights under the AGA lights.

What's Ahead for Airport Lighting

Efforts to improve visual aids to bad-weather landings have produced several different systems and plenty of controversy.

By William Kruger

Lighting an airport used to be simple—a few boundary markers and threshold lights to illuminate the landing area. It isn't any more (except for small fields). Proper lighting of airport runways and their approaches now comes close to being a science—as yet generally unrecognized.

Since the early days of flying, pilots have gone away looking for airports on maps, days and nights alike, yet as severely as the first war planes, the Air Force limited approach lights were an necessity. Still, more recently—less than a year ago—when pilots crashed a plane in the Senate safety investigation by neglecting the runway lighting system, intensive airport lighting for more and better lights.

Even today, with civilian airport construction cranking a new peak, the nation's largest supplier of airport lighting equipment reports that few airport engineers and designers bother to get advance information on runway and ap-

proach lighting for their planning. Industry-wide Problem—For best approach advice, lighting engineers say they need an input from their other sources—aircraft designers, airport engineers and city planners.

• The second designer's role is cockpit arrangement in transport to the pilot looks down at a sharper angle and can see more lights.

• Job of the airport engineers is even more immediate. Lighting experts have been busy lately with today's airport layout. One, runways are getting too wide (they consider 100 ft a good width, 300 ft too much). Under very bad conditions a pilot following a line of lights extending from one edge of a runway cannot see lights on the other side of a wide runway. Two, the sequencing of nearly every runway is interrupted by a highway the gap between the first runway lights and the threshold lights is not wide enough to be confusing when visibility is very poor.

• Concern of city planners is to have the airport closed so there will be no

difficulty in running approach lights out several thousand feet.

These factors highlight some of the extremes of a slowly developing philosophy on approach lighting, complicated by a lack of full understanding of its nature, and its involvement in governmental policy and planning.

Runway lighting is, in contrast, a more solid. The technology is better known, agreement arises more from a basis of competitive merchandising than from any unsettled dispute over the method of lighting.

• Runway Lights—Practically all runway lights being installed now—and those installed in the past few years—spanned 100 feet apart on each side of the runway and are spaced 25 to 50 inches off the ground. They all emit a white light and have five degrees of brightness: 100, 50, 30, 10, and 5 percent. Their intensity, 100,000 up or greater at peak, and the coverage of the beam differ.

Principal manufacturers of runway



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27100	27.5 V	110 V, single phase, 300 VA
		110 V, three phase, 750 VA
27110	27.5 V	110 V, single phase, 1,000 VA
		110 V, three phase, 3,000 VA

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PERSPECTIVE—With glare on proper glide path, left shows perspective when lights are level and parallel and all "washed."

TOWARD CASE POINT—Approach lights on right could be either focused toward runway or mounted downward over an obstacle.

lights are: Convex-Hemis, Wisting house, Revco Electric, American Gas Association (insulated by General Electric) and Line Material Co. Line Material manufacturers and sells lights developed by J. B. Barlow, the pioneer airport lighting specialist Barlow developed, and L-M sold the principle of elevated runway lights (although the Air Force at first insisted 16-in. high lights were a necessity). L-M produced about 40,000 such lights during the war and last year marketed all but one of the runway lighting systems put on commercial fields.

Barlow's Convex-Hemis also developed, but too late for wartime use, the controllable-beam light. This is the backbone of his lighting philosophy for both runway and approach. It is the controllable-beam runway light sets the Barlow light apart and gives L-M its potential selling point—and its competitor their main point of attack. For L-M claims better results with less equipment than used by most of its competitors.

Other lights are knobbed and permanently readied in several degrees to avoid the runway obstacle. The intensity is controlled to meet varying atmospheric conditions. The Barlow light has intensity control, and also a speed-adjustable equivalent of the beam of each light from a master panel in the tower. Purpose is to control glare and haze.

Glass and Hoke—Inductively, the higher the intensity of any light, the greater the possibility of glare. And when there are several lights in a row, each of equal intensity, the brightness of the nearest one tends to diminish the effectiveness of the lights farther away. Hoke effect occurs when there are six, now, five at that particle in the atmosphere, in that a beam of light which ordinarily would not be intercepted by the eye is reflected and absorbed instead of a clear-cut sharp beam, the light source then appears as a great fuzzy blob. It obscures any light behind it.

The ACA, Washington, Revco, and Convex-Hemis lights all cut down on the haze. One argument for this is that aircraft do not

always approach along the centerline of the runway or in the ideal glide path. The Air Force has endorsed the wide beam type of light. Disadvantage of the wide beam is that it emits glare and haze, more probable. USAF says that because of the advantage of the wide beam, any glare is "tolerable," or a "necessary evil."

L-M's view is that glare is never tolerable when it can be eliminated, and it is convinced that Barlow's controllable-beam light does just that. Although the Barlow light peaks at 150,000 cp, higher than most of its competitors, the beam of each light is so beam-steered that it cuts a narrow beam angled to reach a certain point on the centerline of the runway at a given intensity. Result is that the pilot sees only light at the mere intensity all down the runway.

The Barlow lens, made by Corning Glass, utilizes the principle that light travels faster through air than through glass. Mathematical calculations predict slow down and "bend" part of the light to concentrate it into the narrow beam. The intensity is the same in both directions along the runway, and the prism effect is actually light to pass through in the runway and off runway ends, giving the light 100 deg coverage.

Barlow's Low-Perfection of light through bad atmospheric conditions is solely a matter of adjusting. This is based on two principles of physics, the inverse-square law and its complementary formula, Alford's law.

The inverse-square law is merely that as a vacuum can magnify with it, increase a surface one foot away from the extent of one foot-candle, but will illuminate a surface three feet away with only one-ninth foot-candle (mathematical as the inverse divided by square of the distance).

Alford's law takes into consideration that the atmosphere, not being a vacuum, contains particles that cut down light penetration. This fact is coupled with the inverse-square law to give a formula for determining how much light is left after penetrating atmosphere of various conditions.

Light Transmission—As a simple ex-

ample, assume a light of 100,000 cp, is to penetrate a measure fog that has a transmission factor of 10 or over 300 ft. (will permit 10 percent of the actual light) through each 100 ft. of fog. The light is to be visible 300 ft. away. According to the inverse-square law, the light would appear as only 1.11 foot-candle 300 ft. away even if no fog were present. With the fog, the light loses an additional 90 percent of its intensity for each 100 ft. it travels. Recall a source of 100,000 cp, will appear 300 ft. away through moderate fog as only 0.111 cp.

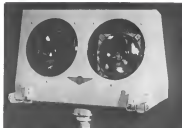
By using Alford's law and using transmission factor values for various atmospheric conditions, lighting engineers can calculate the source candlepower required to penetrate a given number of feet (last chart, page 24).

The application of the inverse-square law and Alford's formula in runway lighting is that as visibility decreases, the maximum penetration of the light will decrease until the beam no longer reaches the centerline of the runway. Convex-Hemis method of mounting the light is to maximize the candlepower at the source for greater penetration.

The long line the Barlow light, however, travels along a small track inside the double lens. This is the controllable feature, permitting the tower operator to "focus" the light as visibility becomes. In effect, rather than trying to get deeper penetration, this lens in practice cuts down the distance between the light and the centerline, that is, cuts down the distance that has to be penetrated. The Barlow light also has the five degrees of intensity in intensity can be assumed if necessary as the lights are noted in.

In effect, the difference between L-M Barlow and the screwdriver of the lighting authority can be explained in brute force (higher intensity for penetration) vs. agility (controlled beam). This also is at least an approach light, plus some way that lack Barlow has evolved not over 15 years of studying lighting.

Approach—Approach lighting of a sort has been used for a number of years, generally consisting of a short



Ene Matriel (Barton) approach light



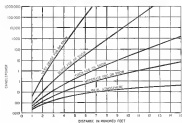
AGA approach light



Westinghouse approach light



Sylvaux approach light



double row of red lights along the runway extension line. But with the effort to attract more reliability and safer instrument approaches, these few lights were acknowledged to be inefficient. Next step was to decide what would be better.

Approach lights do not compose a bad weather landing system. They are only one part of such a system that will also include radio or electronic approach aids. But their role in all-weather landing is nicely entangled in a statement by Lt. Col. Paul R. Ansel, veteran commercial and AAF pilot. "In more than 750 instrument approaches in the Aleutians, I have never made an instrument landing, yet none of these landings were made at the base of official 0/0 weather reports."

In other words, Ansel spotted the approach lights far enough out to make a visual landing. The customary pilot

usually is talking approach lighting in to increase the visibility of the lights. That means higher intensity all the time and has led to the design of very powerful lights carried out far enough (usually to the tower under tower) to orient the pilot in ample time for him to line up with the runway.

► **Westinghouse**—The two most powerful lighting systems being tested probably are those of Westinghouse and Sylvaux. They have one thing in common: they are steady burning and flashing lights. The flashers send a far less beam of light for a fraction of a second. Westinghouse claims its Key-Ton Flasher gives better a flash the equivalent of 3,300,000,000 cp. Sylvaux's Stroboscan flasher unit is said to flash at about 5,000,000 cp.

Westinghouse employs alternate flashers and steady burning lights, 7 ft in all, along the runway centerline ex-

tension from 3225 ft to the threshold lights. The so-called "base" lights (which also can flash in high or 10,000-100 cp) produce a beam of 100, 1000 or 10,000 cp. The flashers operate in sequence beginning every 14 sec. Re-call is that for about 1/100 of a second there appears to be a brilliant white streak pointing toward the runway. In between the flashes, an conditions not restricted enough to require use of the flasher, the red neon "base" lights beam.

The Westinghouse system has been partially installed experimentally at Cleveland Airport, but has not been commercially tested.

► **Sylvaux**—The Sylvaux light has both the flasher and the steady burning light in one unit. Flashers in the center of four neon bars. The lights are installed in a row 2800 ft out from the end of the runway and in a line parallel to the runway centerline. Like the Westinghouse installation, they are spaced close together at the outer end, and further apart toward the runway. Half of the 48 units have the flasher tube, the others do not. Also like the Westinghouse, the Stroboscan flashers in a sequence to flash a dot of intense white light points out the runway.

A complete set of Sylvaux lights has been installed by the Air Transport Association for testing purposes at Newark airport. The installation was finished early this year. It has been and many times by pilots on regular passenger runs and reports are very favorable.

The flasher tube lighting installation was born out of the desire to get extremely high intensity to get positive line without using glare. The theory is that the lights are not on long enough to blind or confuse the pilot. But to

some experts, this very thing makes them inefficient.

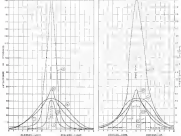
The color of approach lights, the argument runs, is that they give the pilots "fix" on the runway. To do this, they must be continuously lighted. When the pilot first picks up the lights, he should be able to follow them in and make a visual approach. In other words, after he has spotted the lights, he should be able to go off instruments.

But to make a proper approach without shifting his eyes from lights to its surroundings, the pilot must have some guide to his flight attitude and glide path. To give that guide, there have been several instrument system developments.

► **American Gas Accumulator**—AGA, for instance, proposes a row of red lights on each side of the approach path. These are arranged in the shape of a funnel, with its mouth furthest from the beginning of the runway. The theory here is that the pilot will see both rows of lights and they will "funnel" him in to the runway. He is supposed to be able to retain proper flight attitude and glide path by centering on the rows of lights.

A more complex system is proposed by CAA. Known as the "dope line" approach, it involves 25 units on each side of the approach: one center line. Each unit is eight feet long and is mounted with the outside end near the ground so that it makes a 45 deg angle with the horizontal. These units also are illuminated and arranged so that if any pair (lying across the approach axis) were extended, the extension would intersect along the proper glide path.

The result is that if a pilot is making a proper approach he sees only two straight lines of lights, one on each side



Runway light distribution 1, Air Force recommendation, R. A. F. approved, II, was

a the approach axis. If he is off the proper glide path, either in attitude or direction, the lights appear indistinctly at different angles.

Other systems, such as the AGA bar and lights and the Barton radio-sonar approach light system, are all installed at the Landing Aid Experimental Station, Ansel, Calif., which is expected soon for CAA, Air Force and Navy.

► **Perspective Theory**—The Barton system also is installed at the Navy's testing center at Patuxent, Md., and has around unadorned Navy support. Jack Barlow designed its system on the basis of one simple belief: every landing is a road surface and hill, and whether the pilot realizes it or not—is made by per-

spective. Perspective, (available to

displacement, is the phenomenon that all level and parallel lines appear to the eye to retreat or "vanish" toward a common point.

In making a landing, the edges of the runway appear as lines converging to the distance. The pilot uses these lines to establish his ground plane and as long as he knows they are level and parallel, can maintain proper attitude and glide path in relation to the lines.

In his approach lighting system (also manufactured and sold by L.M.I.), Barlow attempts to picture, in effect, contact flight. He insists that approach lights must be arranged in level, parallel rows in line with the runway light-

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READ-
LIMINGS

Only in this way, he says, can a pilot obtain proper perspective. It is extremely bad visibility, a pilot can see only three or four pairs of lights, they will still converge toward the same point as the object at the runway if they are laid out in level, parallel rows.

Barlow claims a pilot cannot obtain perspective from among three or four lights of a single row. "Without the lateral system," he says, "if the view above point of the lights focused by the approach lights is different than the vanishing point of the lines formed by the runway lights."

► **Middle-row-flare** new proposal around row of level, parallel lights on each side of the approach zone. The exact number of rows and arrangement is still subject to further testing, but the system as it is at Pensacola and Austin is four rows on each side for 1000 ft. beyond of the main runway beacon, three rows for another thousand feet, single row on each side from there to the runway. The lighted row of lights are green, the side-light row red.

Purpose of this arrangement is to provide extended coverage under conditions of extremely poor visibility. As indicated in certain manner taking wing approach of a Navy plane at Pensacola with a ceiling of 200 ft. and visibility enough to see only three lights at a time could be seen. During most of the approach the pilot was so far off the centerline he felt the approach area that due to low visibility he could not see the lights on the other side of the zone. Because of the middle row, even then, the pilot could tell whether he was to the right or left of the runway, and approximately how far off center.

(At Pensacola, the Barlow lights used are the conventional new runway type. The Austin installation is L-3's new approach light, costing at \$60,000 apiece.)

► **New System**—For the time being, at least, it appears that the opposing views at the Barlow meeting, the lateral, the beam, and the flared system will be limited to arguments at Austin and other representative stations. All men concerned intensively have agreed on a third-level approach-lighting system—and none of the systems described above fills the bill.

After disagreement on the paper laid of approach lights become obvious by the nature of the controversy, was undertaken by a 12-man committee headed by the Aeronautical Board. It consisted of representatives of CAA, CAA, the Air Force, Navy, Air Line Pilots Association and the Air Transport Association.

This committee studied the problem, and members flew the lights at Newry, Austin and other points. It re-



Line Material (Barlow) runway light.



Whirlingbeam runway light.



AGA runway light.

port recommended a single row of red lights placed along the left-hand side of the approach zone. This will be the system and commercially installed with CAA funds (CAA in the fiscal 1949 budget has asked for money to put in 30 sets). The military system will be the red row on the left, plus an orange row on the right-hand side.

The system decided to supplement the red row with the orange row because their pilots have a lower level of experience than the airline pilots. If later the commercial system does not seem to be working out, it can be changed by the addition of the other row. This would then furnish the beam for a perspective and never one criticism of the single red row.

But new aspect lighting authorities have another complaint. It is the use of red lights. They make the point that red sound an aspect commonly is used

to indicate danger, as in obstruction markers.

► **Color Penetration**—This factor was considered by the lighting committee. It goes through to five different colors: yellow, green, white, blue and red. The decision was based on two factors: efficiency of the color, and their present ones. Efficiency in one respect is not a matter of color. All colors penetrate fog equally. Degree of penetration, again, is a matter of wavelength. However, there is a lot of confusion when the beam passes through the colored filter. The lens is rendered in passing through a clear lens, greater in passing through a blue filter. Next to a clear lens comes yellow, red and green.

Clear lights were discarded because they are used on the left-hand side of the runway for boundary lights, and because they might be confused with street lights. Yellow was discarded be-

cause this color now is used for warning zones and is too similar to redness. Street lights. Green was tossed down because it is used in existing beacons and threshold lights. This left red and this color was chosen despite its use also in obstruction markers. The committee decided that since there would be a long row of red lights and the pilot would be making an inherent approach within fairly similar lights there was little danger of confusion.

There the approach lighting using two sets—at least for a while. In line with the committee recommendation, CAA has ordered from AGA red lights to be installed in a single row at Washington and Los Angeles. There will be other contracts of this type, possibly with other manufacturers. But while taking the business, some are giving up advocacy of its own particular type of approach light.

Wind Tunnel Optics Symposium Held

The first symposium on wind tunnel optics, a new field associated with wind tunnel instrumentation with particular application to those operating at supersonic velocities, was sponsored by the National Bureau of Standards under the technical direction of Dr. J. C. Glasstone, Optical Systems Section, and H. C. Ehrlich, Glass Section. Representatives of the services and government agencies concerned with the problem, directly and through research contracts attended the informal program.

Understanding of optics in a wind tunnel had arisen from the principle that

the density of a compressible fluid is an index to its velocity. By measuring the changes in the index of refraction of the air moving in a wind tunnel caused by pressure changes, a qualitative measure of its velocity may be determined. These pressure changes may be made visible through the use of interference or schlieren apparatus, and it is this field of microscopy that has been termed "wind tunnel optics."

► **New Field**—In the design, construction and use of such equipment, the well-established principles of optics are used, but the use of the equipment and the degree of accuracy required can pass as almost fresh field for the optical engineer and the glass maker. The symposium developed an exchange of information on the technique involved

in the production of large dies, was done and current of high-order accuracy in which optical measurements are reduced to a common basis through coating and other methods.

One of the new instruments with which equipped the designers was the production of fringes through the use of heterodyne light, which presents a broad new field of development both in the production of the equipment and in the analysis of the light patterns produced by the wind tunnel flow around test models.

Although this first symposium was confined to government agencies, future meetings are planned at the Bureau of Standards in which interested government contractors and civilian groups will be invited.

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of 751. Designed to lock up to 11/15 in. at dependent pre-arranged, plate is used to stop object before rotating grip.

Control Switches

For measuring and remote control of radio and radar equipment are newly developed control switches made by Designers for Industry, Inc., 2915 Detroit Ave., Cleveland, Ohio. Type C has VSWR less than 1.25:1 to 6000 mc., less than 1.6:1 to 10,000 mc. Used in single control, two positions (SPDT) design for use with RG-58/U cable. Type D is fully automatic switch, intended to position position by remote vehicle in a single circuit, six positions (SPST) can also be used with same cable. Type Y has applications where power handling is a factor. Used in single circuit, two positions (SPDT) switch, suitable for use with RG-10/U cable. Impedance for all types is 50 ohms.

Circuit Tester

Seen in use and to service technicians, maintenance engineers, production inspectors, and trouble shooters is the pocket-size wide-range circuit tester, series 40, made by Perminco Apparatus Co., 70-37 Horace Harding Blvd., Kew-Forest 1, L. I., N. Y. Self-contained unit affords 10 a-c-d-c. ranges to 6000 v., 600 ma., 70 db., and 5 megohms. Meter has sensitivity of 400 microamperes, and battery range selection permits two pin jacks to serve all standard fuse-fuses. Multiplier and decibel markers are placed accurate to 1 percent. Set has following ranges: a-c-d-c. and auto-ranges (all at 1800 ohms per volt), 5-542-66-100-1200-6000 v. d-c. current, 0.6-6-60-600 ma., 5 resistance (with self-contained batteries), 0.000-500, 930 and 0.5 megohms, and 6 decibel lines -32 to +33.



Trim-Tek Control Switch

Centrifugal, spring-actuated, TC-55-F master switch, for aircraft trim-tab system, is offered by General Control Co., 1200 Soldiers Field Rd., Boston, Mass. Two levels actuate six variable governing levers and remote fields of three electrical thrust meters which operate elevators, ailerons, and rudder trim tabs. Four position toggle lever actuates auxilliary switches to control trim meters providing trim for nose up, nose down, left wing down, and right wing down. Two position lever at top of unit actuates rudder trim tab switch for nose left and nose right trim. Snap-action controls, handling 18 amp., non-inductive load at 240 v. d-c., afford quick reset and back for positive die switching no matter how slowly control lever is moved. Trim tab control unit is contained 3 1/2 x 1 1/2 x 1 1/2 in., housing. An instruction sheet is



Self-Locking Plier

And to aircraft maintenance is new self-locking plier made by Ross Manufacturing Co., 330 Montgomery St., San Francisco, Calif. Through special cam action, mechanism gives high cutting force clamped to hand power when

Reduced Friction

New center block, designed to minimize clearance heat in universal joint type B to 4-in. x 6-in. shafts grooves on each bearing surface, cutting 16,000 amp. instead of heat loss costs. Grooves are intended to reduce size of area subjected to friction by causing more even distribution of heat, increased lubrication, and more uniform and rapid dissipation of heat. Maker is Curtis Universal Joint Co., Springfield, Mass.

Information Tips

Office Instrument-Making Service

Through its new Basic Plan, American Electronic Instrument Co., 1000 Madison St., St. Paul, Minn., will produce complete electrical and electronic instruments, including electronic test equipment, for use in the field. The company's new Basic Plan is a new type of instrument-making service, which will produce instruments for use in the field.

Control Switch

Control switch, designed to minimize clearance heat in universal joint type B to 4-in. x 6-in. shafts grooves on each bearing surface, cutting 16,000 amp. instead of heat loss costs. Grooves are intended to reduce size of area subjected to friction by causing more even distribution of heat, increased lubrication, and more uniform and rapid dissipation of heat. Maker is Curtis Universal Joint Co., Springfield, Mass.

Photo-Micro

Photo-Micro 21 and 22, made by American Photo-Micro Co., 1000 Madison St., St. Paul, Minn., will produce complete electrical and electronic instruments, including electronic test equipment, for use in the field.

Electronics Photographic Aid

Three new electronic aids available from American Photo-Micro Co., 1000 Madison St., St. Paul, Minn., will produce complete electrical and electronic instruments, including electronic test equipment, for use in the field.

Gating Equipment

Controlled electronic instruments for gating of signals are offered in 117-mm. model 117-1, 117-2, and 117-3, which include electronic gating, amplification, and more than 100 other features. The instruments are made by American Photo-Micro Co., 1000 Madison St., St. Paul, Minn.

States Likely to Police Air Safety

Federal, state and industry representatives favor Congressional action to delegate enforcement power.

By Alexander McHugh

State enforcement of federal aviation safety regulations seems likely to get Congressional authorization on a basis of early analysis of hearings on H. R. 6147 and S. 2452, duplicate bills now in committee, which would provide for such enforcement.

new American by the powerful Congress, noted Air Force Board in one of the plants in the Board's platform, for government action to end racism, the proposed legislation would support the people also from CAR, Civil and National Aircraft Council supported it with official recommendations, and Air Transport Association proposed "to support this amendment" to provide for uniform economic regulation of all air carriers under a single federal agency. National Association of State American Officials sponsored the passage of state regulations but asked for greater state authority than the bill would provide.

• **Proposed 800s**—This proposed amending Civil Aeronautics Act of 1938 to permit state courts to suspend aircraft certificates for violation of air traffic rules promulgated by CAB, not more than 10 days, with opportunity for hearing before expiration of that period. There would also permit state court or agency suspension of airworthiness certificates, aircraft certificate or an agency certificate for violations of CAB regulations for six months, after notice and opportunity for hearing.

It also provides that when any action is commenced in a state court or agency, a copy of the complaint would be filed with CMB, and a copy of final judgment in the action also would be ordered with CAS.

A further provision states that "no state, territory or possession of the U. S. or political subdivisions thereof, shall without consent of Congress, impose upon any person any prohibition or requirement which relates to the same subject matter as any provision of Title VI of this act." (Title VI gives authorization for federal regulation of astronaut safety, to the Civil Aeronautics Authority (CAA) and CAB).

► **CAB Technology**—One of the most significant advances in bringing up

puting the granting of state enforcement powers was that of Emory T. Nunnally, Jr., general counsel of C&B. Nunnally frankly warned that despite efforts of CAA and C&B a backlog of safety cases which is carried over from year to year, is steadily increasing.

"During fiscal year 1946," he reported, "438 complaints seeking damages in connection with safety recall orders were filed with the Board by the Administrator. In fiscal year 1947, 583 such cases were filed and for the first time a number of fiscal 1948, 662 were filed. The Board has disposed of 1,000 of such cases disposed of each year accounted for an annual rate of 360 a year, the handling of such cases pending before the Board has increased from 94 on July 1, 1945 to 797 at close 31, 1946. At one meeting he said, this is approximately one year's work for the Board." Presently said a safety lawyer.

• **Officers Reluctant:** "Finally there is reason to believe that there may be reluctance on the part of the enforcement officers to institute suspension and revocation proceedings as late as the run of the barking and the period of time during which the complaint will be hanging over the head of the alleged

vulgarly with the result that the number of suspension and revocations cases is less than might be expected if the docket were reasonably current."

Numerous second floor units are unoccupied. Federal staff expansion takes place, the backing of taxes is likely to continue to increase further as a result of rapid growth of air traffic. Number of pilots holding all grades of aviator certificates has swollen from 22,943 in 1930, to 475,080 in 1947. Number of certificated planes has grown from 10,844 in 1930 to 91,820 as of June 12, 1947.

► **Changes Urged**—He recommends changing minimum suspension allowable to one year to coincide with minimum CAR certificate suspension, instead of the 90 days provided in the bill. He expresses doubt that uniformity of state aviation regulation action can be obtained through the method of model state aviation law, in view of unfavorable past experience with this method.

Chambers County, Indiana state university director and president of NASAA, told the House and Senate hearings that the states "should have a greater voice in the promulgation of regulations they are being asked to enforce." He objected that the present bill had been drafted and presented without any consultation with state government representatives who would ultimately have to enforce it. As a result questions of venue and jurisdictional proceedings in state courts and agencies have been overlooked. The bill is presently written in not amenable form and must be revised into a bill drafted by cooperative action of federal and state government agencies, he concluded.

► **CAA View**—A CAA igorban expressed the view that an armistice could

well as the extensive laboratories used in testing such equipment—are now available to you. Allresearch design and research engineers will welcome the opportunity to tackle your toughest specialized problems involving high-speed wheels; turbines and compressors; actuators with high-speed rotors; air, gas and fluid heat exchangers; air pressure, temperature and other automatic controls.

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Concealed in the fuselage and wings of each B-16 Superbomber are over 100 tough electric "muscles" called actuators.

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CESSNA FERRY PILOT

Steve Withams, famed swing plot and Odessa, Wis., band boss, and Howard Mosey, a Cosmo distributor, take over two new Cosmo 100's at the Wabash

Antony Ice Delivery to San Paulo, Brazil. Shown above are Dan Flores, Creative sales manager; Wirtman, Mr. Wirtman, Dr. Adm. Schweitzer, Mr. and Mrs. Moore.

FINANCIAL

Last-Minute Reprieve for TWA

A CAB award of additional mail pay saves TWA from defaulting on sinking bond payments due Equitable.

Reprieved by a last-minute mail pay award from the Civil Aeronautics Board, Transcontinental and Western Air, Inc., avoided defaulting on sinking bond payments due last week to the Equitable Life Assurance Society.

■ **New Mail Pay:** CAB granted TWA approximately \$1,000,000 in national mail pay on its foreign routes, at the rate of 40 cents a piece mile retroactive to Jan. 1, 1948. The retroactive addition and compensation required the sinking bond payments due May 28 on the company's debentures. Equitable holds the entire \$40 million in debentures issued by the carrier. Were the sinking bond payments delayed, the loss from the mortgage company along with \$8 million in bank loans would have become immediately due.

In that event, it was assumed that control of the airline would have passed to Equitable. This has now been averted, temporarily at least.

Among the disparate bureaucratic moves attempted by the airline was an application to the Transportation Department for a \$10 million loan. RFC refused to grant any advances during 1947 under more favorable circumstances, and it is considered unlikely now that aid will be forthcoming from the source.

■ **RFC Assistance:** It is not generally appreciated, but before RFC can advance a loan to a troubled air carrier, CAB must authorize such aid. "It is expected to meet its final charge without a reduction thereof through partial suspensions of that provision in an amendment made last May 10, 1947," the RFC's CAB has made clear one such certification, in the case of Western in September, 1947.

Were the Board to refuse a RFC loan to TWA under such circumstances, it would imply that sufficient mail pay adequate to service the advance would be forthcoming. At the present time, TWA has a number of court suit proceedings pending before CAB, and in certain CAB enforcement of a RFC loan would, in effect, prejudice those suit rate cases.

■ **Bank Credit:** "Temporarily in the background but likely to resume re-opening imminently" is the \$13 million

bank credit established to protect the airline to finance the purchase of 12 new Constellation. Only \$5 million of this credit has been drawn upon thus far and that was the amount which would have become immediately due upon default of that carrier's debentures on the debentures.

This bank credit was endorsed by Lockheed as a "charitable gesture" in order to facilitate the sale of the planes. Perfit, Curtis-Wright Corp. had agreed to accept TWA's notes in payment of the Wright engines to be used in the planes, either then discount each paper at the bank payable to the Lockheed company. In other words, it said when TWA should default on this bank loan, the bank will have recourse to Lockheed for its share of the liability.

■ **Person Crisis:** One of the main reasons in the courts to be pursued by the Flight Test Co., owner of 40 percent of the \$45,525 TWA share outstanding. The Hughes interests also own a \$10 million convertible note representing the bonds advanced to meet a payment claim in 1947. This note is no longer payable in cash but can be liquidated only through conversion into common stock any time before June 1950. It is expected, at the holder's option, at the average discount price ten days previous to the date on which conversion. The conversion price cannot be lower than par value of 35 per share. There are a total of 2 million assumed shares covered for this purpose. For all practical effects, the lower the price, the greater number of shares Hughes may obtain through conversion.

Should the option be exercised in 10, exactly one million shares will be acquired, leaving Hughes' total exposure to about three-quarters of the airline's outstanding stock. At the last bid price of \$5 over 12 percent of the total would be acquired. In view of this diluting scale of possibilities it is not too difficult to appreciate why Hughes, while being able to buy a one million interest in RWA for more than \$5 million, is reluctant to place additional funds in TWA.

■ **Further Reduction:** The National Association of Insurance Commissioners, through its Subcommittee on Video

Notes of Investments, after first placing a price of 75 percent of face value, on the TWA debentures only a few months ago offered a further reduction to 60 percent. In other words, as of Dec. 31, 1947, Equitable was directed to carry its \$40 million TWA loan on its books at \$24 million.

The only other major loan which is presently placed at a share of United Airlines, Metropolitan Life Insurance Co. holds \$10 million and MetLife Life owns \$2 million of that carrier's debentures. The insurance commissions have directed that these bonds be written down to 85 as of Dec. 31, 1947. Thus far, United has fulfilled all requirements of its lenders and it is an immediate danger of defaulting.

■ **AA's \$400 Million:** American Airlines has a \$400 million debenture trust outstanding, which unlike the TWA and United loans, has a "hard" market with daily quotations, providing as a result of wider public distribution. American's bonds are usually quoted at 75. Equitable also owns \$20 million of the American debentures.

It is highly probable that Equitable may be drawn down into the management of TWA.

■ **Readjust Job:** It is ironic that Equitable's apparent lack of understanding of airline operations is precisely responsible for TWA's present predicament. The carrier is known to be doing an excellent job from the standpoint of operations. The basic difficulty stems from the financial policies pursued a few years ago.

In leasing TWA had \$70 million and later an additional \$30 million, Equitable did not want any additional equity capital being brought into the airline at the same time. The losses were assumed to be self-paying, although depreciation charges on such equipment. Post experience has adequately demonstrated that the acquisition of new routes and expansion is a primary expense and requires considerable new funds achieving profitable results. Further, in the highly leveraged TWA picture, a few adverse developments would work havoc with the airline's financial picture.

Through circumstances beyond its control, TWA ran into rough financial matters. Funds designed to purchase new equipment were utilized to meet pressing expenses.

■ **Equity Money:** Equitable had conditioned its loan upon more equity money being brought into the company at the same time. It is probable that TWA's capital structure would have been strong enough to ride out the recent storm.

At the present time the basic financial problem remains and at some point a reorganization of the company's constitution appears inevitable—Edgar Mitchell

AIR TRANSPORT

More Deficits for Domestic Lines?

With first-quarter reports still showing heavy losses, 16 trunklines face third successive year in red.

The domestic trunklines are following the 1947 financial course. They have since 1945 with the same severe losses that marked last year's first quarter. And they wound up that year with the worst deficits in their history.

On the basis of a \$15,700,196 net loss in the first three months of 1948, the 16 companies face the prospect of a deficit for the third successive postwar year. In 1947, the carriers had a \$13,400,460 deficit on the first quarter and finished the year with some \$20,900,000 in the red.

■ **DC-6 Grounding:** Except for the continued grounding of the DC-6, first-quarter 1948 probably would have been far better than the same period last year. With the DC-6s now held in service and traffic on its seasonal opening, the industry hoped to do away with its deficit considerably under the 1947 level.

But only a phenomenal growth in business combined with sharply increased fuel pay could give the carriers an overall profit this year.

Worst losses in first quarter were reported by American Airlines and United Air Lines, which were hit hardest by the DC-6 grounding. American posted a \$1,655,322 net loss for the three months compared with a \$3,822,

912 net figure in the same 1947 period. United had a \$3,461,291 net loss in domestic operations in the first quarter this year against a \$5,377,871 deficit last year.

■ **Deficit Cut by TWA:** By contrast, TWA, emboldened by the DC-6 ground stop, cut its first-quarter domestic deficit from \$1,741,568 in 1947 to \$1,466,416. Northwest Airlines, the fourth best domestic carrier, had a net loss of \$1,972,151 in first quarter 1948 against \$1,289,644 last year.

Added by the Northwest Airlines strike, Eastern Air Lines' first-quarter profit slipped from \$584,951 in 1947 to \$1-123,446 this year. National, which together with Eastern was the only domestic trunkline to show a profit in first quarter 1947, \$208,675 had a changing \$715,930 loss during the first three months of this year. With its best traffic season now past, and the strike continuing, National's outlook for the remainder of the year is bleak.

■ **Better Showing:** Among the smaller carriers, Capital, Chicago & Southern, Central and Continental showed some indication as to the state of first-quarter 1948 deficits. Deficits reported by Delta and Mid-Continent were up.



\$3,000,000 HOME FOR AA FLAGSHIPS

American Airlines has transferred the lot of its installations at Chicago Municipal Airport to this large new hangar with over two acres of space for parking and maintenance planes in with its three floors of offices, stock rooms, restaurants and a mail

and orders about 625 ft. long and 240 ft. deep, the structure consists of two bays, each sheltering a fleet of up to 275 ft. and a depth of 775 ft. Flight Comm. Lines or an DC-6s and two Constans can be stored simultaneously in each bay.

1st Quarter Earnings

(Domestic Operations Only)

Carrier	Net Profit	Net Profit
	1948	1947
American	\$1,655,322	\$3,461,291
Eastern	\$584,951	\$1,289,644
Delta	\$1,466,416	\$1,741,568
Mid-Continent	\$1,466,416	\$1,741,568
National	\$1,466,416	\$1,741,568
Northwest	\$1,972,151	\$1,289,644
United	\$3,461,291	\$3,461,291
Capital	\$1,466,416	\$1,741,568
Chicago & Southern	\$1,466,416	\$1,741,568
Central	\$1,466,416	\$1,741,568
Continental	\$1,466,416	\$1,741,568
Transcontinental	\$1,466,416	\$1,741,568
Western	\$1,466,416	\$1,741,568

Source: 4410 1948-1947-1946-1945

(Parentheses indicate loss)

Source: Aviation News Service

Total operating revenues of the domestic trunklines in last quarter 1948 were considerably higher than last year. But expenses also jumped.

Spurred by low 10 percent fuel surcharges, passenger carriers' general earned 15 percent despite a five percent decline in traffic (Aviation Week, May 26). Mail and freight revenues also jumped.

■ **Domestic Services:** Meanwhile, U. S. international carriers also lost heavily during first-quarter 1948. On the basis of temporary mail rates, TWA had a net deficit of \$1,437,710 on its overseas routes. American Overseas Airlines lost \$1,581,462 in the red.

Pan American Airways reported \$499,551 net profit on its Atlantic operations, \$174,085 profit on Pacific operations, \$15,291 profit on the Alaskan run and \$38,557 net loss on Latin American routes. The figures are based on interpolated receipts at \$43.13 per ton and revenue costs that actually earned present temporary rates.

Northwest showed a \$128,410 net profit on its Great Lakes in first-quarter 1948. United lost \$849,241 on its Hawaiian run, Colonial lost \$5,932 on Nevada operations and National net \$53,837 in the red on its Hawaii service during the first three months of the year, while Chicago & Southern earned \$17,335 on its Hawaii route.

Cases Reopened

CAB has reopened its Mississippi Valley Area case to determine whether Continental Air Lines or Mid-Continent Airlines should be allowed to operate the Kansas City, Kansas City St. Louis route originally awarded to VICA last December. Establishment of feeder service in Louisiana, Mississippi and Alabama, and between points in that area and Memphis, Tenn., also will be reconsidered.

41

FOR DEFENSE AND COMMERCE

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THE GRUMMAN PANTHER—Newest Jet fighter for the U. S. Navy is designed to operate from land or carrier bases. Outstanding construction features permit very short takeoffs and landings and include innovations in wing and cockpit. Capable of extremely high speeds, the Panther is equipped with the most powerful turbo-jet engine in the world.



THE GRUMMAN ALBATROSS—Built for the U. S. Navy, the Albatross is the largest of Grumman amphibians. Powered by two 1,425 horsepower engines, this versatile plane is designed for rough water operation. Planned for air-rescue or cargo transport it carries a crew of three and sixteen litter passengers, or two tons of cargo. The Albatross has a cruising speed of 225 miles per hour.



GRUMMAN AIRCRAFT ENGINEERING CORPORATION, Bethpage, Long Island, New York